

NASA
George C. Marshall Space Flight Center
RECORD OF ENVIRONMENTAL CONSIDERATION

Project: Reporting to General Service Administration that the property on Santa Susana Field Laboratory is excess to NASA

Description and location of proposed action: NASA has conducted research, development, and testing of liquid-propelled rocket engines at SSFL under the Boeing Company, Rocketdyne Propulsion & Power (Rocketdyne) since 1948. On August 2, 2005, Pratt & Whitney purchased Rocketdyne from Boeing, but refused to acquire SSFL as part of the sale. As a result of the purchase, NASA's test operations at SSFL have been discontinued and the property is excess.

NASA has ended engine testing operations at SSFL and followed internal screening procedures to ensure that no NASA program or project could utilize the NASA-owned property on SSFL. After ensuring that NASA has no use for NASA-owned property on SSFL, NASA proposes that GSA dispose of the excess property the property by sending a Report of Excess Real and Related Personal Property (SF118) to the regional GSA office.

See attached Environmental Analysis and Report of Excess Real and Related Personal Property (SF118) for further information.

- A. Anticipated date and/or duration of proposed action: FY 2008
- B. It has been determined that the above action (choose one):
- a. ____ Is adequately covered in an existing EA____, EIS____, entitled _____ and dated _____.
 - b. ____ Qualifies for Categorical Exclusion as described by NPR 8580.1 and NASA NEPA Regulations 14 CFR 1216.305, and has no special circumstances which would suggest a need for an Environmental Assessment.
 - c. ____ Is exempt from NEPA requirements under the provisions of (cite superseding law): _____
 - d. X Has no environmental impact as indicated by the results of an Environmental Analysis Checklist and/or a detailed Environmental Analysis (attach Checklist and/or Environmental Analysis as applicable).
 - e. ____ Will require an Environmental Assessment or Environmental Impact Statement.
 - f. ____ Will include mitigation as described below:

Other Environmental Consideration (i.e. permits, hazardous material handling): See attachments. An Environmental Review was prepared to document baseline conditions. Reporting of NASA-owned real property at SSFL to GSA contemplates no significant change in the existing use of the land. NASA will continue RCRA cleanup activities. NASA will lead Natural Historic Preservation Act (NHPA) effort, with GSA coordinating.

Signed: _____

Allen Elliott

Date: _____

11/14/07

Manager, Environmental Engineering and Occupational Health Office (EEOH)

NEPA Preliminary Evaluation

Project Name: Reporting to General Service Administration that the property on Santa Susana Field Laboratory is excess to NASA

Project Contact(s): n **New Construction** **N/A** **Modification**
 Allen Elliott, NASA/MSFC 256-544-0662 Donna
 Holland NASA/MSFC 256-544-7201

Project Description: NASA has ended engine testing operations at SSFL and followed internal screening procedures to ensure that no NASA program or project could utilize the NASA-owned property on SSFL. After ensuring that NASA has no use for NASA-owned property on SSFL, NASA proposes that GSA dispose of the excess property the property by sending a Report of Excess Real and Related Personal Property (SF118) to the regional GSA office.

Originator Signature:

Phase Starts in FY:

Donna L. Holland 11/14/07
2008

Construction Phase:

	No	Yes	Maybe	Comments
a) Affects wetlands, floodplains, protected species or critical habitat.	X			N/A - No construction is involved in this property transfer
b) Have impacts to cultural or historical resources.	X			
c) Impacts a CERCLA restricted site.	X			
d) Potential to cause soil contamination.	X			
e) Requires use or storage of toxic or hazardous materials.	X			
f) Will generate hazardous, toxic or radiological wastes.	X			
g) Causes air pollution or have discharges to air.	X			
h) Requires new Clean Water Act permit or modification.	X			
i) Causes water pollution or have water discharges.	X			
j) Potential to impact quality of groundwater.	X			
k) Requires use of groundwater.	X			
l) Potential to violate safety, health or noise standards.	X			
m) Requires use of radiation (ionizing or non-ionizing).	X			
n) Requires use of pesticides, herbicides, fungicides, etc.	X			
o) Uses Class I ozone-depleting substances.	X			
p) Potential exposure to asbestos or lead containing materials.	X			
q) Have transportation impacts (new roads, traffic, parking).	X			
r) Significant increases in labor force.	X			

NEPA Preliminary Evaluation

Project Name: Reporting to General Service Administration that the property on Santa Susana Field Laboratory is excess to NASA

Project Contact(s): n **New Construction** **N/A** **Modification**
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Originator Signature:

Donna L. Holland 11/14/07

Operational Phase:	No	Yes	Maybe	Comments
a) Potential to disproportionately impact low income or minority populations.	X			
b) Affects wetlands, floodplains, protected species or critical habitat.	X			
c) Have impacts to cultural or historical resources.	X			NASA proposes to lead Cultural Resource Management with GSA coordinating.
d) Impacts a CERCLA restricted site or RCRA site.		X		RCRA clean up will continue under NASA management pursuant to August 2007
e) Potential to cause soil contamination.	X			
f) Requires use or storage of toxic or hazardous materials (including propellants and explosives).	X			
g) Will generate hazardous, toxic or radiological wastes.	X			
h) Causes air pollution or have discharges to air.	X			
i) Requires new air permit or Title V modification.	X			
j) Causes water pollution or have water discharges.	X			
k) Requires new Clean Air Act permit or modification.	X			Air permits for SSFL are issued to the Boeing Company. Rocket testing operations were removed in 2007.
l) Significant increases in use of potable water.	X			
m) Potential to impact quality of groundwater.	X			
n) Requires use of groundwater.	X			
o) Potential to violate safety, health or noise standards.	X			
p) Requires use of radiation (ionizing or non-ionizing).	X			
q) Requires use of pesticides, herbicides, fungicides, etc.	X			
r) Uses Class I ozone-depleting substances.	X			
s) Potential exposure to asbestos or lead containing materials.	X			
t) Significant increases in energy consumption.	X			
u) Have transportation impacts (new roads, traffic, parking).	X			
v) Significant increases in labor force.	X			
w) Impacts community socio-economics.	X			

Environmental Review

Reporting to General Service Administration that the property on Santa Susana Field Laboratory, California is excess to NASA



Prepared by

National Aeronautics and Space Administration
Marshall Space Flight Center
Huntsville, Alabama

Environmental Review

Transfer of NASA-Owned Property on Santa Susana Field Laboratory, California

Questions or comments may be directed to

Donna L. Holland
Environmental Engineer
Mail Code AS10
Marshall Space Flight Center, AL 35812
256-544-7201

or

Allen Elliott
Manager, Environmental Engineering Department
Mail Code AS10
Marshall Space Flight Center, AL 35812
256-544-0662

Preface

Environmental Review Organization

This environmental review addresses Marshall Space Flight Center's (MSFC) proposed action to report to General Services Administration (GSA) that NASA-owned property on is excess.

Section 1: Purpose of and Need for the Proposed Action summarizes the purpose of and need for the proposed action and discusses the scope of the document.

Section 2: Description of the Proposed Action and Alternatives describes the proposed action and the alternatives to the proposed action.

Section 3: Affected Environment describes the existing conditions of each resource for which the proposed action and alternatives to the proposed action are evaluated.

Section 4: References.

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1. Purpose of and Need for the Proposed Action

This Environmental Review (ER) examines the potential for environmental impacts as a result of reporting to General Service Administration (GSA) that approximately 450 acres (182 hectares) of NASA-owned property on the Santa Susana Field Laboratory (SSFL), in Ventura County, California is excess. Due to a decrease in operations the property is in excess of National Aeronautics and Space Administration's (NASA's) needs.

NASA is required to analyze the environmental consequences of this action under NEPA, as amended (42 U.S.C. 4321 et seq.), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500 through 1508), and NASA's regulations (14 CFR Part 1216 Subpart 1216.3). NASA is evaluating potential impacts resulting from reporting the excess property to GSA. GSA will evaluate potential impacts due to property disposal alternatives in a separate NEPA evaluation. This review has been prepared as a supplement to regulatory requirements for implementing NEPA.

1.1 Background

On April 29, 1985, President Ronald Reagan signed Executive Order 12512 (E.O. 12512) requiring all landholding Federal agencies to periodically review their real estate holdings. Federal agencies are further directed to identify property they do not need, use too little, or don't use for the best purpose. Executive Order 12512 requires the General Services Administration (GSA) to provide government-wide oversight and guidance for Federal property management. The proposed action is to reduce NASA's real estate holdings by reporting excess property on Santa Susana Field Laboratory (SSFL) to GSA for disposition.

The SSFL is a Government Owned/Contractor Operated (GO/CO) facility that occupies 2,850 acres (1153 hectares) and is located approximately 29 miles Northwest of Los Angeles, CA, in the Simi Hills area of Ventura County as shown in Figures 1-1 and 1-2 below. The property is bounded by Canoga Park, in Los Angeles County on the east, Bell Canyon on the south, the Brandels-Barden Institute on the north, and Semi Hills on west. The areas immediately surrounding SSFL are commercial and residential.

The site is divided into four areas (Areas I to IV) and a buffer zone. Areas I, III, IV, and the buffer zone are owned by Boeing. NASA owns 408 ac (165 ha) designated as Area II and a 42-acre portion of Area I. This environmental review focuses on the reporting of excess NASA-owned areas of the SSFL.

The site has been active since 1948 and has included the research, development, and testing of liquid-propelled rocket engines and associated components (pumps, valves, etc.) under the Boeing Company, Rocketdyne Propulsion & Power (Rocketdyne). On August 2, 2005, Pratt & Whitney purchased Rocketdyne from Boeing, but refused to acquire SSFL as part of the sale. As a result of the purchase, NASA's test operations at SSFL have been discontinued and the property is excess.

Figure 1-1. Santa Susana Field Laboratory Regional Map

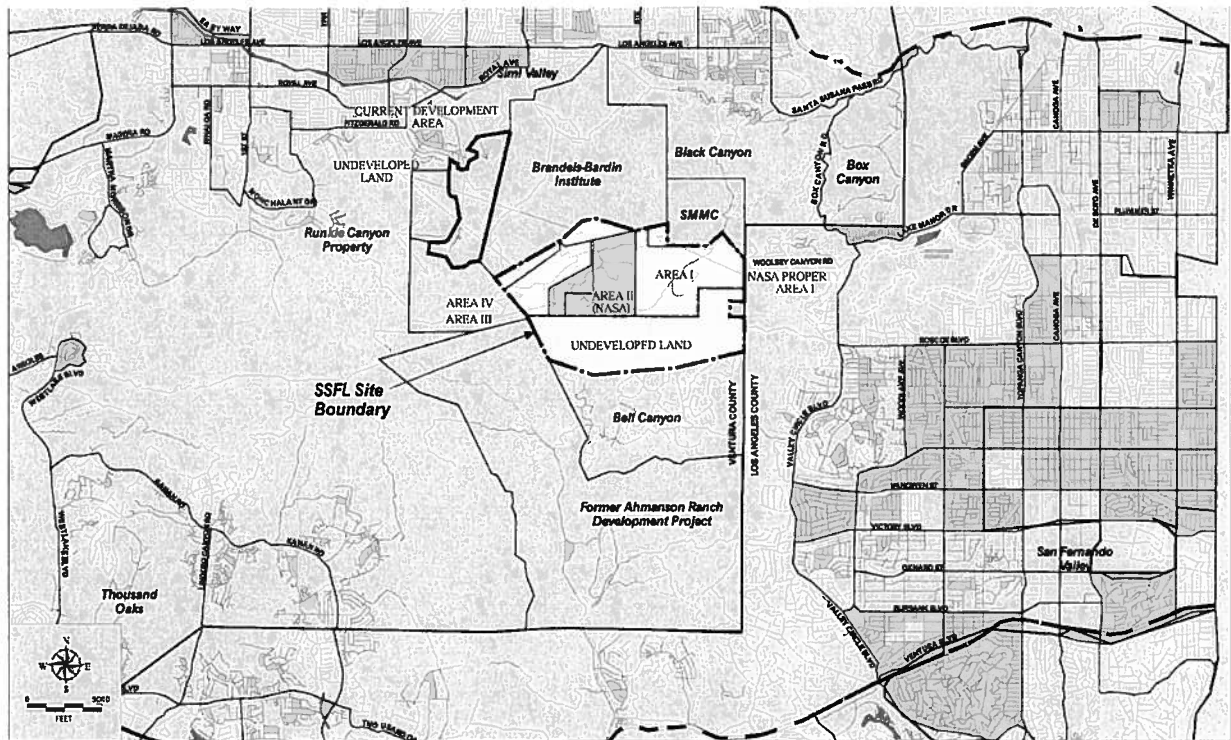
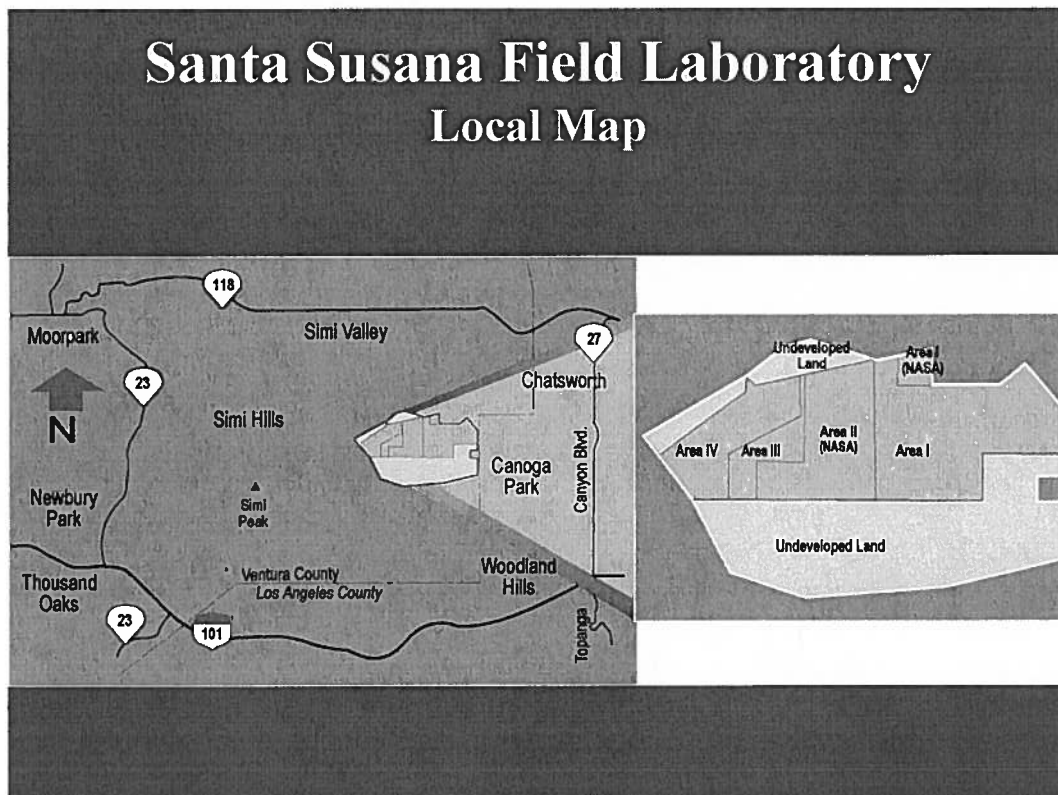


Figure 1-2. Santa Susana Field Laboratory Local Map



1.2 Need for the Proposed Action

NASA has ended engine testing operations at SSFL and followed internal screening procedures to ensure that no NASA program or project could utilize the NASA-owned property on SSFL. After ensuring that NASA has no use for NASA-owned property on SSFL, NASA proposes that GSA dispose of the excess property the property by sending a Report of Excess Real and Related Personal Property (SF118) to the regional GSA office.

1.3 Purpose (Objectives) of the Proposed Action

The purpose of requesting GSA to dispose of NASA-owned property is to utilize asset management principals, strategies, and techniques in determining how to best reutilize NASA-owned property on SSFL.

1.4 Decisions to Be Made

The primary decision to be made by NASA, supported by the information presented in this review, is whether to report excess NASA-own property on SSFL. This review is written to provide the NASA decision maker with information required to understand the potential environmental consequences of the request to GSA to manage disposal of NASA-owned Areas I and II at SSFL.

1.5 Public Involvement

This review does not include public involvement.

1.6 Environmental Regulations and Permits

NASA is listed as the owner of the property and Boeing as the operator on all permits at SSFL.

1.6.1 Clean Air Act

Ventura County Air Pollution Control District has issued two permits of operate (PTO) to The Boeing Company. One has federally enforceable emission limits covering most of the SSFL sources (permit number PTO #232). This permit includes all of NASA operations for emission sources for all areas at SSFL; these sources are outlined in Table 1-1 and lists only those that are currently permitted. In March 2006, all rocket engine testing was completed. A permit modification was applied for in late 2006 to remove rocket engine and component testing operations including Alfa, Bravo, and Advanced Propulsion Test Facility, Systems Test Laboratory, and Hypergol Facility, an aerospace paint spray booth, remote reservoir cold cleaners and cold cleaning tanks. The revised permit was granted in 2007.

Boeing also operates a second air permit for Laser and other laboratory operations. This permit, Number 00271, is for Boeing operations only and includes the solvent wipe cleaning operations only.

Table 1-1 Air Permit for SSFL

Permit Scope	Permit Number	Effective Date
Rocket Engine and Component Assembly Operations	00232	July 1, 2007 – June 30, 2008
Solvent Cleaning Operations	00232	July 1, 2007 – June 30, 2008
Surface Coating Operations (Spray Booth)	00232	July 1, 2007 – June 30, 2008
Adhesive and Sealant Operations	00232	July 1, 2007 – June 30, 2008
Portable Diesel Engines	00232	July 1, 2007 – June 30, 2008
Emergency Diesel Engines	00232	July 1, 2007 – June 30, 2008
Groundwater and Remediation Operations	00232	July 1, 2007 – June 30, 2008
Gasoline Dispensing Facility	00232	July 1, 2007 – June 30, 2008
Boilers and Heaters	00232	July 1, 2007 – June 30, 2008
Solvent Wipe Cleaning Operations	00271	Jan. 1, 2007 –Dec. 31, 2008

Note: Ref. Ventura County Air Pollution Control District, 2007.

1.6.2 Clean Water Act

The SSFL fresh water system is a potable water system supplied by the Ventura County Waterworks District No. 17. Backflow prevention devices for the freshwater distribution system protect the domestic water supply. Bottled water is provided at SSFL for drinking and other uses. An NPDES permit issued by the Los Angeles Regional Water Quality Control Board (RWQCB) regulates the surface water discharges from SSFL (Boeing, 2000; CH2M HILL, 2006b). There are 18 NPDES locations throughout SSFL at which surface water discharges are monitored regularly (Montgomery, Watson, Harza [MWH], 2004).

The majority of surface water that is collected or drains from SSFL is intermittent and is conveyed offsite into one of four drainages (the Northwestern, Northern, Happy Valley, and Bell Creek drainages). Discharges generated from groundwater extraction activities (after treatment to discharge standards) enter the Bell Creek drainage located in the central portion of SSFL. The former engine testing activities also generated discharges of water (MWH, 2004).

1.6.3 Waste Connection Permit

Historically, waste discharges from the SSFL have been regulated since 1959. Waste discharge requirements (WDRs) were issued by the Los Angeles RWQCB to regulate sewage and industrial waste discharge onsite (nonhazardous leach fields). There are no longer any active leach fields at the SSFL, and the WDR permit was rescinded by the RWQCB in 1994. STPs are inactive (standby status) and all sanitary waste is disposed to the municipal sewer system (MWH, 2004).

1.6.4 Comprehensive Environmental Response, Compensation, and Liability Act

SSFL is not listed as a CERCLA NPL site, but is involved with several RCRA corrective action projects.

1.6.5 Resource Conservation and Recovery Act

SSFL has a comprehensive environmental program under the jurisdiction of several federal, state, and county regulatory agencies. There are five environmental programs at SSFL that are being conducted under the authority of RCRA. In addition, other federal, state, and county environmental programs are being managed at the SSFL. These programs are implemented to ensure that facility operations are conducted in an environmentally protective manner, and that investigation and cleanup are performed to meet regulatory standards (MWH, 2004).

1.6.5.1 RCRA Programs

The five major RCRA environmental programs at SSFL are under the oversight and jurisdiction of the Cal-EPA DTSC. These programs include: 1) RCRA Corrective Action; 2) Closure of inactive RCRA units; 3) compliance and permitting of RCRA units; 4) groundwater characterization and remediation; and 5) interim measures. Some of these programs overlap; however, there are separate guidelines and process requirements. Collectively, the programs described above provide a comprehensive basis for the handling and cleanup of hazardous substances (MWH, 2004)

RCRA Corrective Action. This program includes the RFA, RFI, Corrective Measures Study (CMS), and Corrective Measures Implementation (CMI) phases. In 1992, the DTSC issued a Stipulated Enforcement Order that initiated the RCRA Corrective Action Program at the SSFL. Three Hazardous Waste Facility Permits were issued to Boeing by DTSC to provide specifications for the CAP. The permits govern the RCRA CAP at the SSFL and include: 1) the Areas I and III Post-closure Permit issued in 1995; 2) the Area II Post-closure Permit issued in 1995; and 3) the Area IV Hazardous Waste Management Facility Operating Permit issued in 1993 (MWH, 2004).

Compliance and Permitting of RCRA Units. The permitting and compliance of active and inactive RCRA-regulated units at SSFL are regulated by this program, which includes the storage areas and waste disposal practices. A Post-closure Permit for groundwater treatment system operations in Area II has been issued by the DTSC for active RCRA facilities at SSFL (MWH, 2004).

1.6.6 Toxic Substances Control Act

SSFL has implemented a program to replace or retrofit PCB-transformers with non-PCB transformers over time and to manage PCB-related wastes at SSFL. Currently, SSFL has no PCB-containing transformers remaining that contain above 50-parts per million (ppm)

PCBs. A lead-based paint survey at SSFL has positively identified lead-based paint at numerous buildings at SSFL (CH2M HILL, 2006a).

Several SSFL buildings contain asbestos. Construction projects that involve asbestos removal are evaluated as they occur, and removal and disposal are performed per the applicable state and federal requirements.

1.7 Issues Considered but Eliminated From Further Analysis

NASA has used a systematic and interdisciplinary approach to ensure that all resources were analyzed and potential issues were identified. Table 1-2 identifies issues that were determined to have no impact and were eliminated from further discussion.

Table 1-2. Issues considered but eliminated from further analysis.

Element	Rationale
Geology	Site preparations for the disposition of Areas I & II would not extend below grade in either area, and therefore, would not affect subsurface geological formations. Therefore, there are no impacts to geology expected as a result of the proposed dispositions of SSFL at either proposed site.
Coastal Zone Management Program	This resource is not present in the vicinity of the property, therefore there would be no impact.
Coastal Barriers	This resource is not present in the vicinity of the property, therefore there would be no impact.
Wild and Scenic Rivers	This resource is not present in the vicinity of the property, therefore there would be no impact.
Protected Farmlands	This resource is not present in the vicinity of the property, therefore there would be no impact.
Socioeconomics	
Demographics	Disposition NASA-owned property at SSFL would not result in an increase or decrease in personnel; therefore, the local population would not be impacted.
Income	Disposition NASA-owned property at SSFL would not result in an increase or decrease in personnel; therefore, income levels of the local population would not be impacted.
Housing	Disposition of NASA-owned property at SSFL would not result in an increase or decrease in personnel; therefore, the housing demands would not be impacted.

Schools	Disposition of NASA-owned property at SSFL would not result in an increase or decrease in personnel; therefore, there would be no impact to area schools.
Medical Facilities	Disposition of NASA-owned property at SSFL would not result in an increase or decrease in personnel; therefore, medical facilities would not be impacted.
Security	Disposition of NASA-owned property at SSFL would not result in an increase or decrease in personnel; therefore, security resources would not be impacted.
Fire Protection	Disposition of NASA-owned property at SSFL would not result in an increase or decrease in personnel; therefore, the fire protection resources would not be impacted.
Infrastructure	
Energy	Energy consumption on the NASA-owned property at SSFL is minimal, therefore no impacts to energy consumption are anticipated due to the proposed actions.
Transportation	
Roadways	Use of roadways at SSFL

2 Description of the Proposed Action and Alternatives

This chapter of the environmental review describes the proposed action and alternatives and summarizes the potential impacts associated with reporting excess NASA-owned property at Santa Susana Field Laboratory (SSFL) to the General Services Administration (GSA).

2.1 Release of Property to GSA (Proposed Action/Preferred Alternative)

As a result of Pratt/Whitney's purchase of the Rocketdyne Engine Test Operations from the Boeing Corporation, operations at SSFL have been discontinued and the property is excess to NASA.

In a coordinated series of actions for disposition of associated assets, all NASA-owned real and personal property at SSFL has been evaluated in accordance with NASA Procedural Requirements (NPR) 8800.15, *Real Estate Management Program Implementation Manual*, and NPR 4300.1, *NASA Personal Property Disposal Procedural Requirements*, to determine whether the property could be reutilized by another NASA program or project.

Upon validation that the property is no longer needed by NASA, the preferred alternative would be to release the NASA-owned real and personal property at SSFL to the United States General Services Administration (GSA) for conveyance to other Federal, state, local, or private individuals.

2.1.1 NASA-owned Real Property on SSFL

The SSFL is located approximately 29 mi (47 km) northwest of downtown Los Angeles, California, in the southeast Simi Hills area of Ventura County. The SSFL occupies approximately 2,850 acres of hilly terrain and is divided into four areas (Areas I to IV) and a Buffer Zone. Areas I, III, and the Buffer Zone are owned by Boeing. NASA owns 408 ac (165 ha) designated as Area II and a 42-acre portion of Area I. All areas at SSFL are operated by the Boeing Company. A portion of Area IV is leased to the DOE. This environmental review focuses on the NASA-owned areas of SSFL.

The site has been active since 1948 and has included the research, development, and testing of liquid-propelled rocket engines and associated components (pumps, valves, etc.). The rocket engine testing of the liquid-propelled engines was conducted in four major test areas identified as Alfa, Bravo, Coca, and Delta. During the 1950s and 1960s, these test areas were in operation simultaneously. Other support areas with Area II include fuel farms, hydrogen compressor building, Propellant Load Facility (PLF), Service Area, and Storable Propellant Area.

Future land uses with current site conditions may restrict reuse activities to protect human health and the environment. These conditions include potential contamination from past releases of hazardous substances and NASA's efforts to remediate the contamination. The NASA SSFL remediation activities and other environmental studies may result in lease/deed restrictions that limit reuse options at certain locations within the property boundaries. Additionally, NASA may retain access rights to these sites to implement remediation (i.e., a temporary easement for access to monitoring wells and remediation equipment).

2.1.2 NASA-owned Personal Property on SSFL

An ongoing survey is being conducted to evaluate all personal property at SSFL.

2.2 No Action Scenario

Under the No-Action Scenario, NASA would maintain the facilities in such a manner as to facilitate resumption of use in the future. The buildings and surrounding grounds would be maintained at minimum levels. Small quantities of hazardous materials would be used during preventative and regular facility maintenance and grounds maintenance activities. Utility usage and vehicle trips would be minimal, requiring a maximum of two employees to care for the grounds. No improvements would be made to the facilities or infrastructure.

2.3 Alternatives Considered but Not Carried Forward

SSFL was considered for use by other NASA programs and projects. The installation was determined to be no longer necessary for NASA operations.

2.4 Further Actions in the Region

Further NASA actions in the region may include NASA's efforts to remediate present contamination.

3. Affected Environment

The Affected Environment section of this EA describes the existing environmental resources of the area that may be affected by the proposed alternative, if it were implemented. Issues considered but eliminated from further analysis, identified in Section 1.7.

3.1 Introduction

SSFL is located approximately 29 miles northwest of Los Angeles, in the Simi Hills area of Ventura County, California. The site has been active since 1948 and has included the research, development, and testing of liquid-propelled rocket engines and associated components (pumps, valves, etc.). The rocket engine testing of the liquid-propelled engines was conducted in four major test areas identified as Alfa, Bravo, Coca, and Delta. During the 1950s and 1960s, these test areas were in operation simultaneously. Other support areas with Area II include fuel farms, hydrogen compressor building, Propellant Load Facility (PLF), Service Area, and Storable Propellant Area. (CH2M HILL, 2007)

3.2 Local Community

The SSFL is located in southeastern Ventura County in rugged terrain near the crest of the Simi Hills. The Simi Hills separate the Simi Valley from the western part of the San Fernando Valley. The facility occupies a plateau approximately 1,000 feet above the floor of the west San Fernando Valley and encompasses 2,850 acres (1,153 hectares) (DOE, 2007).

3.2.1 Community Setting

The areas surrounding SSFL consist mostly of parks, open space, and private property with agricultural, residential, and recreational land uses. Approximately 70 percent of the area within a 5-mile radius of the SSFL is undeveloped. No significant agricultural land use, including prime or unique farmland, exists within 19 miles (30 kilometers) of the site. Residential development is located about .75 mi (1.2 km) to the east of the SSFL on Woolsey Canyon Road and in areas about two miles north of the SSFL. Residential areas located .50 mi (.80 km) south of the SSFL are separated from active portions of the SSFL by an undeveloped buffer zone. There are no wild and scenic rivers on or near the SSFL (DTSC 2007).

The location of the SSFL site in relation to nearby communities is shown in Figure 3-1, and explained below.

Northern Adjacent Properties

There are two properties to the north of the Santa Susana Field Laboratory (SSFL). The property located to the northwest is owned by the Brandeis-Bardin Institute. The property located to the northeast is owned by the Santa Monica Mountains Conservancy (SMMC) which preserves land for parks, open space, trails, and wildlife habitat.

Eastern Adjacent Properties

The properties to the east of the SSFL include open space and housing developments. Dense residential development begins in the San Fernando Valley about two miles east of the SSFL.

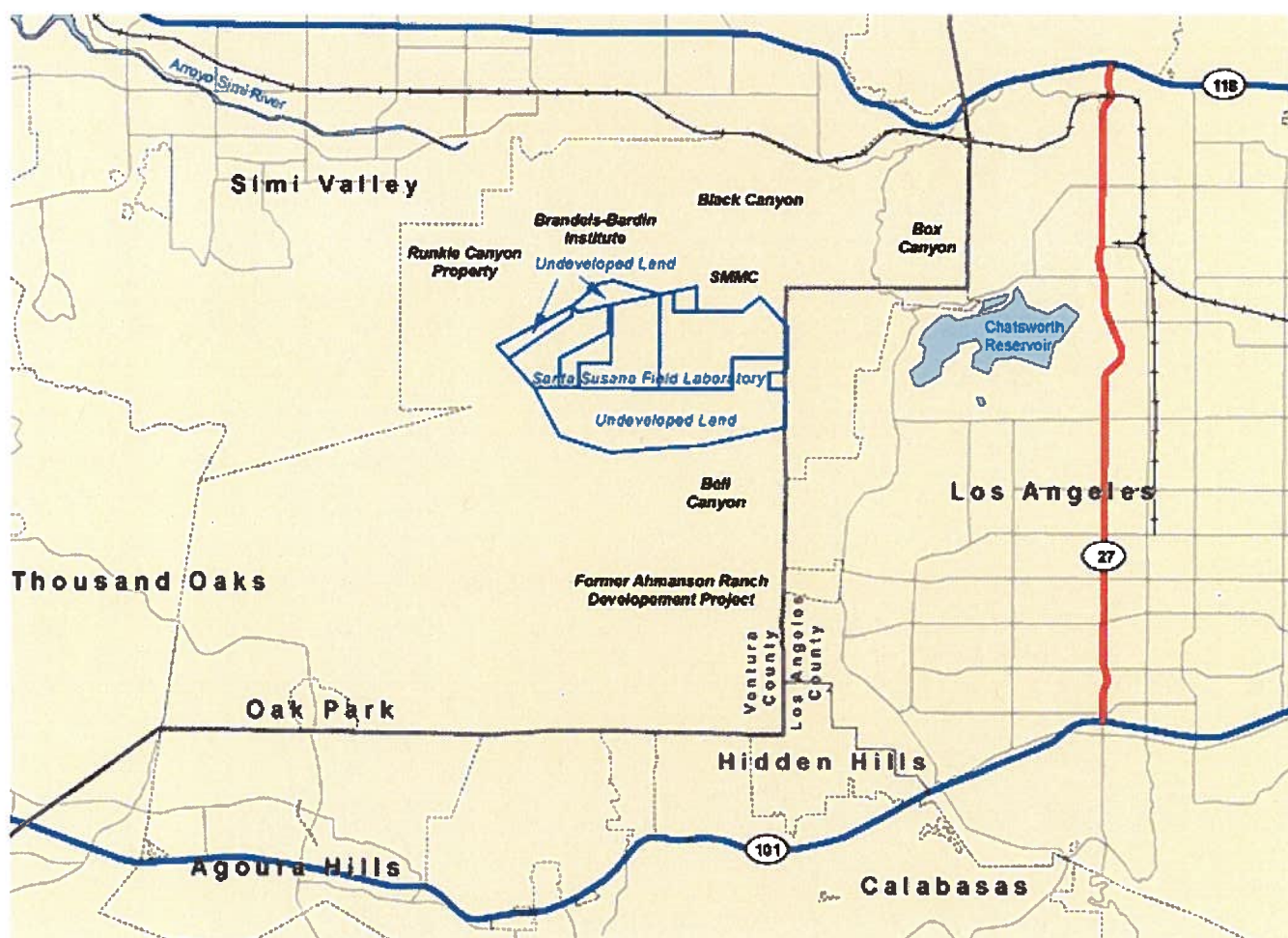
Southern Adjacent Properties

The Bell Canyon area begins approximately 1.4 mi (2.3 km) to the southeast of the undeveloped area at SSFL and the primary use is residential development.

Western Adjacent Properties

Runkle Canyon is located to the west of the SSFL and is designated by the Ventura County planning department as open space. This land is used for cattle grazing (DOE 2007).

Figure 3-1. Region surrounding SSFL



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3.2.2 Land Use and Aesthetics

3.2.2.1 On-Site Land Use

SSFL is divided into four areas (Areas I, II, III, and IV). These areas along with a buffer zone comprise approximately 2,850 ac (1,153 ha). NASA currently owns the 42-acre former Liquid Oxygen Plant site in Area I. NASA also owns 410 acres in Area II on which are situated four rocket engine test stands. (NASA, 1998)

In 1948, North American Aviation acquired the land area now known as SSFL. The SSFL site has been used primarily for testing liquid fuel-propelled rocket engines, many related to the early Apollo space missions. In addition, the SSFL site was the location of research, development, and testing of MX missile engines, water jet pumps, "Star Wars" lasers, liquid metal heat exchanger components, coal gasification and liquification processes, and related technologies. In 1955, Atomics International (a division of North American Aviation) and DOE began developing and testing nuclear reactors on the site. Operations at SSFL have involved the use of organic solvents, hydrazine fuels, kerosene-based fuels, oxidizers, liquid metals, asbestos, polychlorinated biphenyls (PCBs), hydraulic oils, and various radionuclides (see Appendix C for a complete listing).

Atomic International (AI) merged with Rocketdyne in 1984 and Rocketdyne's name was kept. In 1996, all nuclear operations ended; since that time the nuclear reactors and reactor sites have been undergoing decontamination and decommissioning (D&D) under the oversight of DOE. Boeing and Rocketdyne merged in 1996. SSFL is now jointly owned by Boeing and the National Aeronautics and Space Administration (NASA), and is operated by the Rocketdyne Propulsion and Power Division of Boeing.

The SSFL site is divided into four administrative areas (I, II, III, and IV) and undeveloped buffer properties to the northwest and south (Robinson, 1998; Ogden, 1998b).

- Area I consists of 671 acres owned by Boeing and 42 acres owned by NASA in the northeast portion of the site. Area I houses administrative and laboratory facilities including the North American Kindleberger Atwood Lab (NAKA), the former Area I Thermal Treatment Facility (TTF), also known as the open pit burning facility; and three rocket engine test areas: the Bowl, the Canyon, and the Advanced Propulsion Test Facility (APTF) areas. The Bowl and Canyon test areas were phased out of operation in the late 1960s and 1970s.
- Area II consists of 410 acres at the north-central portion of the site. It is owned by NASA and operated by Rocketdyne. Area II contains two formerly used rocket test firing facilities (Coca, Delta) and two rocket test firing facilities (Alfa, Bravo), as well as the NASA-associated Systems Test Laboratories (STL). Delta test areas were phased out of operation in the late 1960s and 1970s. The Coca test area was shut down in May 1988.

- Area III consists of 114 acres at the northwest portion of the site and is owned and operated by Rocketdyne. The Systems Test Laboratories-IV (STL-IV) and the Engineering Chemistry Lab (ECL) are located in Area III.
- Area IV consists of 290 acres owned by Boeing and operated by Boeing's Rocketdyne Division and 90 acres leased by the DOE. DOE and its contractors operated nuclear reactors, associated fuel facilities, and laboratories within this area from 1955 until 1988. Area IV is the location of the former Sodium Reactor Experiment complex (SRE) and the Rockwell International Hot Lab. Since 1988, the site has maintained a program to monitor and clean up radiological contamination.
- The Buffer Areas consist of two undeveloped plots (175 and 1,140 acres) northwest and south of SSFL, respectively (Figure 1-2). Two National Pollutant Discharge Elimination System (NPDES) discharge outfalls and drainage channels are located within the southern boundary area (outfalls 001-002). The northern boundary was purchased by Boeing from the adjoining Brandeis-Bardin Institute in 1997 (GRC, 1999).

Chemical waste generated at the SSFL facility was treated and stored on site, including in surface impoundments (ponds). SSFL has had 28 of these ponds over the course of its history; they are designed to collect cooling and rinse water, storm water runoff, and accidental spills (GRC, 1987). Eleven of the ponds were designated in 1977 as hazardous waste facilities under the Resource Conservation and Recovery Act (RCRA) of 1976 (GRC, 1987). Since 1977 only two of these eleven ponds were reportedly the only impoundments that were part of the water reclamation system that stored and treated hazardous wastes on a routine basis: the Engineering Chemistry Lab (ECL) pond in Area III and the Laser Engineering Test Facility (LETf) pond in Area I (GRC, 1987). These two ponds were excavated in 1984 and the material was sent to a Class I disposal facility (Hargis, 1985). Active use of the other nine impoundments ceased in 1985, and those ponds have been undergoing RCRA closure (GRC, 1987). Five impoundments are still in use (R-1, Perimeter, Silvernale, R2-A, and R2-B ponds; Boeing, 2003).

In addition to surface impoundments, there are 17 known areas where waste materials were stored or treated (Hargis, 1985). According to Groundwater Resources Consultants (GRC, 1987), many of these areas may have lacked proper containment facilities to prevent release of contaminants to the environment in the event of improper storage or spills throughout their operation. (Center for Environmental Risk Reduction, 2006)

First NASA Use of the SSFL Facilities - In 1962, the USAF contracted with NASA for joint use of Plant Number 57 for a 20-year period. NASA contracted separately with Rocketdyne to operate these facilities for NASA. For 12 years, the NASA facilities and the USAF facilities contracts ran concurrently with Rocketdyne. Rocketdyne continued to operate test facilities for the USAF while also operating them in support of supply contracts for NASA. Rocketdyne continued to use TCE to clean the engines after test firings.

NASA Acquisition of Area II - In November 1972, the USAF granted NASA a permit to use Plant Number 57 and Plant Number 64 to test the Space Shuttle Main Engine, with the understanding that the USAF would eventually transfer titles to NASA. In June 1973, the USAF declared this property surplus and transferred it to the General Services Administration for disposal. In November 1973, the General Services Administration transferred the property to NASA. From that point, Plant Number 57 and Plant Number 64 became known as Area II. (NASA, 1998)

The Coca area consisted of four test stands for rocket engine testing using primarily petroleum-based fuels (kerosene) and LOX as the oxidizer. The Coca area has been inactive since 1988. Coca Test Stand No. 1 has been dismantled. The Hydrogen Compressor Area consists of three buildings associated with the compression of gaseous hydrogen (GH₂) for use during engine testing activities in the Coca area (CH2M HILL, 2007).

The Storable Propellant Area (SPA) consists of six buildings that were used for storage of drums containing fuels and oxidizers. The SPA was divided into two areas designated for fuel storage and oxidizer storage. (CH2M HILL, 2007)

The Service Area is comprised of 13 buildings. The Service Area provides many different operations including maintenance, protective services, research and development (R&D) of various rocket engine components, final assembly for expendable launch vehicles, and R&D for lasers. Approximately half of the buildings in the Service Area are currently active. (CH2M HILL, 2007)

3.2.2.2 Adjacent Land Use

The communities surrounding SSFL have changed since the area's early industrialization in 1946. The area was sparsely populated before 1970. USGS maps (USGS, 1952, 1967) indicate that fewer than six buildings were present in the areas directly bordering SSFL before 1967, with approximate near-border population of 20 individuals. Development in the area and population increased significantly since the establishment of SSFL. In 2000, the population within 1 mile of SSFL was about 6,000 (U.S. Census Bureau, 2000).

Currently, there are residents who live directly adjacent to the eastern and southern site boundaries. Two mobile home parks are located east of the site on Woolsey Canyon Road. The residential areas closest to the facility are Bell Canyon to the south, Lakeside Park and Dayton Canyon to the east, and Box Canyon and Woolsey Canyon to the northeast. The nearest communities are Chatsworth (~3 miles east, population ~67,000), Canoga Park (~5 miles southeast, population ~100,000), Simi Valley (~3 miles north, population ~100,000), and Thousand Oaks (~7 miles southwest, population ~100,000). The neighboring lands to the north and west of SSFL are zoned rural/agricultural or agricultural. Lands to the south of the facility are zoned rural. To the east, land has been designated as light agricultural.

3.3 Utilities

3.3.1 Water Supply

Water used at SSFL is supplied to the region by Calleguas Municipal Water District and provided to the facility by the Ventura County Water Works District No. 17. Purchased water enters via a 100,000 gallon transfer tank located at the northeast boundary of Area I. The main storage reservoir is a one million gallon tank and three 100,000-gallon tanks located in Area II. A gravity fed distribution system serves all of SSFL from this source. (SAIC, 1994)

Backflow prevention devices for the freshwater distribution system are used to protect the domestic water supply. Bottled water is provided at SSFL for drinking and other uses.

3.3.2 Wastewater

Historically, water used for industrial purposes was discharged to onsite ponds. Both the R2-A pond and the Perimeter Pond discharged to drainage channels which convey wastewater off-site through the Buffer Zone. Water was normally reclaimed and stored for industrial uses, however, during periods of heavy rainfall, water was released from the R2-A Pond and Perimeter Pond to Bell Creek (Hargis, 1985). Discharges generated from groundwater extraction activities (after treatment to discharge standards) entered the Bell Creek drainage located in the central portion of SSFL (CH2M HILL, 2007). There have been no industrial discharges since March, 2006 (NASA 2007).

A NPDES permit issued by the Los Angeles Regional Water Quality Control Board (RWQCB) regulates the surface water discharges from SSFL. There are 18 NPDES locations throughout SSFL at which surface water discharges are monitored regularly. (CH2M HILL, 2007)

The Perimeter Pond discharges to Bell Creek from Discharge Point 001 located in the Buffer Zone, and R2-A discharges to Bell Creek from Discharge Point 002 in the Buffer Zone. (EPA, 1989) (DOE, 1989) Prior to the release, the pond wastewater quality is determined to ensure that all parameters are in compliance with the NPDES permit requirements. (EPA, 1989)

The majority of surface water that is collected or drains from SSFL is intermittent and is conveyed offsite into one of four drainages (the Northwestern, Northern, Happy Valley, and Bell Creek drainages). It is estimated that more than 60 percent of the surface water from SSFL is directed to the southern boundary through Bell Canyon and into Bell Creek. The waters from Bell Creek discharge into the Los Angeles River. Water discharges from the southern portion of the site are monitored by NPDES Outfalls 1 and 2. Surface waters on the eastern portion of SSFL drain through Dayton Canyon and Dayton Creek. Dayton Creek later combines with Bell Creek downstream before joining the Los Angeles River. The NPDES Happy Valley monitoring location monitors surface water discharges from this portion of the site. Surface water drainages from the

northwestern portion of the site drain into Meier Canyon, which later drains into Arroyo Simi. NPDES Outfalls 4,5,6, and 7 monitor surface water discharges from the northwestern portion of SSFL. (CH2M HILL, 2007)

Five surface water ponds are located in SSFL. These ponds are either themselves RCRA Facility Investigation (RFI) sites (R-1 Pond [SWMU 4.16], Perimeter Pond [SWMU 4.17], R-2 Ponds [SWMU 5.26], and Silvernale Reservoir [SWMU 6.8]), or they occur within an RFI site (Coca Pond [SWMU 5.19]). The surface water ponds associated with Area II are briefly described below. A 300,000 gallon capacity reservoir called the Coca Pond is located to the west-northwest of the Coca test stands. Discharges from this perennial pond lead to the R-2A Pond. (CH2M HILL, 2007)

There are two surface water ponds that comprise the R-2 Ponds (R-2A with a 6 million gallon capacity, and R-2B with a 500-gallon capacity). Surface water from the Coca and Delta test stands and treated groundwater enter the R-2A Pond. Surface drainage from Silvernale Reservoir and the Burro Flats area of SSFL drains to R-2B Pond. A subsurface culvert allows water from R-2B to drain to R-2A. Discharges from R-2A Pond flow to the Bell Canyon Drainage and NPDES Outfall 2. (CH2M HILL, 2007)

3.3.3 Solid Waste

Historically, waste discharges from the SSFL have been regulated since 1959. Waste discharge requirements (WDRs) were issued by the Los Angeles RWQCB to regulate sewage and industrial waste discharge onsite (nonhazardous leach fields). There are no longer any active leach fields at the SSFL, and the WDR permit was rescinded by the RWQCB in 1994. Sewage Treatment Plants (STPs) are inactive (standby status) and all sanitary waste is disposed to the municipal sewer system. (CH2M HILL, 2007)

3.4 Hazardous Materials and Hazardous Waste Management

3.4.1 Known Contamination Sites

The 42-acre portion of Area I that is NASA's responsibility was the former U.S. Air Force Liquid Oxygen Manufacturing Plant #64 that produced liquid oxygen for engine testing. The facility has been demolished. No other facilities are on the 42 NASA-owned acres in Area I. The major activities in Area II was rocket engine testing. Area II contains four test areas: Alfa, Bravo, Coca, Delta. Testing began at Alfa and Bravo in 1953 and concluded in 2006. Coca was activated in 1956 with three test stands that supported the Atlas program and then the NASA Space Shuttle program through testing of the Space Shuttle Main Engine. Coca has been inactive since 1988. Delta was activated in 1957 to support the Thor, Jupiter, Lance, and J-2 engine testing programs. Testing ceased at Delta in 1970, and all Delta area test stands were dismantled in 1982.

SSFL is a RCRA (Resource Conservation and Recovery Act) Corrective Action Site under the jurisdiction of the California-EPA, Department of Toxic Substance Control (DTSC). NASA and the Cal-EPA DTSC are working together to remediate

contamination found in the soil, sediment, and groundwater. The media at SSFL are grouped into 1) surficial media (soil, sediment, surface water, and near-surface groundwater) and 2) deep groundwater/bedrock.

Surficial contamination in soil, sediment, air, weathered bedrock, surface water and near-surface groundwater is the result of testing support facilities such as landfills, deluge ponds, storage facilities, treatment systems, and underground tanks. The major contaminants found are TCE, dioxins, polychlorinated biphenyls, poly aromatic hydrocarbons, metals, furans, and hydrocarbons. There are 15 corrective areas that include 42 solid waste management units (SWMUs) and areas of concern (AOCs) on NASA-owned property at SSFL. Since 1990, NASA has investigated and performed actions at these SWMUS and AOCs. A number of NASA units have been closed, including

- Building 231 PCB Storage Facility
- HWSA Container Storage Area
- Storage Propellant Area (SPA) Impoundments 1 and 2
- Alfa/Bravo Skim Pond (ABSP) and Drainage Pipes
- Delta Skim Pond and Drainage
- Propellant Load Facility (PLF) Impoundment
- Building 207 Diesel UST
- UST across from Alfa/Bravo Fuel Farm (ABFF)

NASA has submitted an application for the renewal of their Post-Closure Permit to address follow-up monitoring for some of these closed units and continues to monitor these units.

The deep groundwater/bedrock primary contaminants are TCE, cis-1,2-dichlorethene and to lesser degrees, Freon-113, 1,4 dioxane, NDMA, and petroleum hydrocarbons. The presence of trichloroethene (TCE) in the groundwater is due to the engine cleaning procedures. TCE was flushed through the engines to remove hydrocarbon deposits and vapors left in the engines by the kerosene fuel after engine testing or checkout to prevent premature ignition. TCE was also used to clean testing areas and tools. The TCE was released through concrete spillways, to an unlined channel, and finally to an unlined skim pond and/or retention pond. The ponds drained into surface drainage and into Bell Creek. Starting in 1962, TCE was collected and was no longer released. NASA and the Cal-EPA DTSC are working to characterize and monitor the groundwater. Groundwater samples are taken and analyzed from over 400 wells, springs, and piezometers and computer modeling is being used to understand how the groundwater and contaminants move.

Some previous groundwater treatment systems have been closed. Area II groundwater treatment systems permitted under the RCRA, Part B have been closed. Operations at two sets of four air stripping towers at Bravo Test Area ceased in 2000, and operations for one ultraviolet/peroxidation unit at RD-09 area were put on standby in 2000. A new state-wide system is under construction.

TABLE 3-2

Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) at SSFL

Site ID	Site Name
SWMUs	
4.5	LOX Plant Waste Oil Sump and Clarifier
4.6	LOX Plant Asbestos and Drum Disposal Area
5.1	Area II Landfill
5.2	ELV Final Assembly Building 206
5.5	Building 204 Former Waste Oil UST (UT-50)
5.6	Former Area II Incinerator Ash Pile
5.9	Alfa Test Area
5.10	Alfa Test Area Tanks
5.11	Alfa Skim Pond and Retention Pond
5.12	Alfa Bravo Skim Pond (ABSP)
5.13	Bravo Test Area
5.14	Bravo Test Stand Waste Tank
5.15	Bravo Skim Pond and Drainage
5.16	Storable Propellant Area Surface Impoundment-1 (SPA-1) and Drainage
5.17	SPA Surface Impoundment-2 (SPA-2) and Drainage
5.18	Coca Test Area
5.19	Coca Skim Pond and Drainage
5.20	Propellant Load Facility Waste Tank
5.21	PLF Ozonator Tank
5.23	Delta Test Area
5.24	Delta Skim Pond and Drainage
5.25	Purge Water Tank near Delta Treatment System
5.26	R-2A and R-2B Ponds and Drainage
AOCs	
AOC	Building 515 Sewage Treatment Plant (STP) Area
AOC	Storable Propellant Area (SPA)
AOC	Alfa/Bravo Fuel Farm (ABFF) and Stormwater Basin
AOC	Coca/Delta Fuel Farm (CDFF)
AOC	Drainage Pipes under ABSP

TABLE 3-2

Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) at SSFL

Site ID	Site Name
AOC	Area II Service Area, Building 211 Leach Fields
AOC	Alfa Control Center, Building 208 Leach Field
AOC	Alfa Pretest, Building 212 Leach Field
AOC	Bravo Recording Center, Building 213 Leach Field
AOC	Bravo Pretest, Building 217 Leach Field
AOC	Coca Pretest, Building 222 Leach Field
AOC	Coca Upper Pretest, Building 234 Leach Field
AOC	Coca Control Center, Building 218 Leach Field
AOC	Delta Control Center, Building 224 Leach Field
AOC	Delta Pretest, Building 223 Leach Field
AOC	Building 207 Diesel UST (UT-53)
AOC	UST across from Alfa/Bravo Fuel Farm (ABFF) (UT-52)
AOC	Building 206 Diesel UST (UT-51)
AOC	Two Underground Tanks at Plant Services (UT-48 and UT-49)

3.4.2 Hazardous Materials and Hazardous Waste Management

The Boeing Company operates the NASA-owned areas of Santa Susana Field Laboratory and conducts the hazardous materials and waste management. The Boeing Company is responsible for the clean up of spills, pick up of drums of wastes from around the site, on-site storage of waste, and arrangement for transportation of waste for proper disposal. Hazardous wastes are stored at SSFL in a joint NASA, Boeing, and DOE ninety-day storage area. A contractor to the Boeing Company removes waste from SSFL for proper disposal.

All USTs at SSFL were closed in 1996. The facility does not have any active USTs onsite at this time (NASA, 2007a).

Within Area II of SSFL, there are approximately nine ASTs that contain hazardous substances. The tanks are used for storage, chemical supply, and petroleum storage. The tanks' use and emergency spill response are included in SSFL's Spill Response Plan (NASA, 2007a).

NASA has had an active Pollution Prevention (P2) program at SSFL since the late 1980's. The program was initiated to reduce the use of hazardous materials and associated wastes generated at SSFL (NASA, 2007a).

3.4.3 Asbestos, Lead, and PCB's

Buildings at SSFL were constructed when materials such as asbestos insulation, lead-based paint, and light fixtures with PCB-containing ballasts were used. Several buildings at SSFL contain asbestos. If buildings require modification, demolition or other activities that may disturb asbestos the projects are evaluated as they occur, and removal and disposal are performed per the applicable state and federal requirements (NASA, 2007a). The Ventura County Air Pollution Control District regulates asbestos removal projects.

SSFL has implemented a program to replace or retrofit PCB-transformers with non-PCB transformers over time and to manage PCB-related wastes at SSFL. Currently, SSFL has no PCB-containing transformers remaining that contain above 50-ppm PCBs.

An LBP survey at SSFL positively identified LBP at numerous buildings at SSFL (NASA, 2007u).

3.5 Soils

The SSFL soils are primarily Quaternary alluvium. The soil depth varies from a few feet to approximately 20 feet. Erosion of the surrounding geological formations created the unconsolidated sand, silt, and clay, which compose the Quaternary alluvium. The thick layer of bedrock underlying most of SSFL is the Chatsworth Formation. Massive, cliff-forming sandstone beds that are at least 6,000 feet thick characterize the Chatsworth. The exposures of Quaternary alluvium and the Chatsworth Formation compose the Simi Hills of SSFL. (ICF, 1993)

3.6 Water Resources

3.6.1 Surface Water

Surface water from the SSFL drains primarily toward the south into Bell Creek and then eastward to the Los Angeles River with its confluence located in the San Fernando Valley. Surface water in the very north portion of the SSFL drains via various drainages into Meier and Black Canyons, which lead to the Arroyo Simi located in Simi Valley (DOE 2007).

Two parallel and interconnected pond and drainage systems comprise the SSFL watershed. Twenty-four ponds were at one time included in this system, however several of these ponds have been closed and filled. Many of the ponds and drainages are man-made features used to store water for the rocket testing facilities. (Hargis, 1985) This system makes up the site-wide water reclamation system (EPA, 1989)

A pond and channel system drains a large portion of Area I. The water reclamation system is designed to recycle settled water from the R-1 Reservoir (R-1). As the supply for water exceeds the demand, R-1 overflows to the Perimeter Pond. (SAIC, 1994)

The pond and channel system for Areas II, III, and IV consists of two retention ponds, the R-2A and R-2B in Area II and the Silvernale Reservoir in Area III. (SAIC, 1994)

Past surface water contamination occurred in Areas I, II, and III due to TCE engine flushing operations in the 1950s and 1960s. Waste TCE was discharged directly to surface impoundments (SWMUs 4.14, 4.15, 5.11, 5.12, 5.15, 5.19, 5.24, 6.6, and 6.7) that were part of the SSFL surface water reclamation system. It is not known if any of this contamination migrated off-site through the Bell Creek drainage. Currently, the SSFL water reclamation system discharge is regulated by an NPDES permit granted in the late 1970s. (EAE, 1989) Table 3-3 gives NPDES permit requirements for monitoring of the discharge ponds prior to any batch discharge to off-site for the following constituents:

Table 3-3 NPDES Maximum Discharge Limitations		
<i>Constituents</i>	<i>Concentrations (mg/L)</i>	<i>Quantity* (lbs/day)</i>
Total Dissolved Solids	950	1,267,680
BOD ₅ @20°C	30	40,035
Oil and Grease	15	20,020
Chloride	150	200,160
Sulfate	300	400,320
Fluoride	1.0	1,340
Boron	1.0	1,340
Surfactants (as MBAS)	0.5	667
Residual Chlorine	0.1	---
<i>*Based on a total waste flow of 160 million pgd (CRWGCB)</i>		

In 1987, Rockwell sampled surface runoff water that drains north of the facility and is not part of the water reclamation system. The sample results were compared to the maximum contaminants levels (MCLs) for drinking water, although the runoff from the site is not used for drinking water purposes. The MCL for arsenic was exceeded at several sample locations. Methylene chloride levels exceeded the DHS action level of 40 µg/L in two samples. Although samples indicated contaminated surface water runoff exists in the north part of the SSFL, it is not known if these contaminants were released to any off-site surface water bodies. The drainages north of the facility are ephemeral channels;

therefore, a potential exists for surface water runoff to have percolated into the soil before reaching a surface water body or to have been discharged into the channels. (EAE, 1989)

3.6.2 Groundwater

Two groundwater systems exist at SSFL: 1) a shallow groundwater system in the surficial alluvium and the underlying zones of weathered sandstones and siltstones, and 2) a deeper groundwater system in the fractured Chatsworth Formation. Surface runoff may be stored and transmitted from the shallow groundwater system to the underlying Chatsworth Formation. (GRC, 1986)

The shallow zone is composed of unconsolidated sand, silt and clay eroded from the surrounding formations and the underlying weathered in-place portion of the Chatsworth Formation. The shallow zone is discontinuous and subject to seasonal variations throughout the SSFL. It is saturated along ephemeral channels and in the southern part of Burro Flats. The saturated portion of the shallow zone may be as thick as 10 feet at SSFL. Shallow zone water level data indicates that the piezometric surface mimics the topographic surface. Depth to water has ranged from 2 feet to a maximum of 35 feet. This variation is season and location dependent. In general, water level highs occur in late winter and dearly spring. Groundwater moves laterally and downward in the shallow zone.

The shallow zone aquifer appears to be separate and distinct from the Chatsworth Aquifer; however, water levels and water quality data from some sections of SSFL indicate there may be a hydraulic connection between the two systems. (Hargis, 1985)

The Chatsworth Formation system is primarily a fracture controlled aquifer composed of bedded sandstone with interbeds of siltstones and claystone. The Chatsworth is highly fractured in the SSFL area. (The California Department of Health Services (DHS) believes that the formation might not be highly fractured. (EPA, 1990) Aquifer tests indicate highly varying degrees of permeability of the Chatsworth Formation. This may be attributed to the fractured nature of the Chatsworth. The estimated ranges or permeabilities are from approximately 10^{-2} gallons per day per square foot (gpd/ft²) to approximately 10^3 gpd/ft². (Hargis, 1985)

Current water level contours of the Chatsworth system indicate that groundwater in the central and northeast portion of the site appears to be migrating toward the site's pumping cone of depression. This cone of depression has been maintained in the northeast quarter of the facility by the pumping of water supply wells since the late 1950s. In the northwestern section of the site, water level data suggests the presence of a northeast to southwest groundwater divide accompanied by a northwesterly groundwater flow component. A southerly component of groundwater flow is indicated by water level contours in the southwest portion of the site. (Hargis, 1985)

Groundwater pumpage has had a significant impact on water levels and groundwater movement at the site. Vertical groundwater movement may be induced by prolonged pumping with a consequent reduction in hydraulic head. In fractured systems such as the

Chatsworth, this effect may be quite dramatic. In 1988, the pumping from extraction well WS-9A induced 30 feet of drawdown in an observation well 1,600 feet away. (GRC, 1989)

Depth to groundwater is seasonally variable in the Chatsworth system. In general, high water levels occur during winter and spring months and low water levels occur in summer and fall. (GRC, 1989)

The most widespread and prevalent groundwater chemical contaminants at the site are VOCs. TCE and trans-1,2-dichloroethylene (trans-1,2-DCE) are the most frequently detected contaminants in groundwater samples. Sources for the VOCs are widely distributed throughout the site and include the engine and rocket testing areas, pavement washdown areas, laboratory solvent use areas, surface impoundments, spills, cleaning operations, and tanks used for the storage of hazardous materials and hazardous waste. Groundwater investigations indicate extensive VOC contamination in groundwater underlying these areas. (EAE, 1989)

Rockwell initiated a hydrogeological study of the Alfa/Bravo Area in 1984. As part of that study, existing water supply wells were sampled. TCE and trans-1,2-DCE were detected in the water supply well samples. The groundwater contamination was investigated further, along with the probable sources. Surface impoundments were used for spill containment, and hazardous waste storage and treatment were determined to be the likely sources of VOC contamination. (SAIC, 1994)

SSFL's groundwater monitoring system included approximately 163 wells and springs of which 147 are on-site wells. These wells were constructed as part of the groundwater contamination investigation that followed the discovery of VOC contamination in water supply wells. Rockwell constructed seven groundwater treatment systems to remediate VOC contaminated groundwater. Five of the treatment systems are dual air stripping towers with vapor phase carbon treatment, one is an ultraviolet/hydrogen peroxide (UV/H₂O₂) system, and one is a four tower air stripping system. (DHS, 1990) The systems are connected to extraction wells to treat pumped, contaminated groundwater. Each system is designed to reduce the organic contaminants in the pumped groundwater to below the DHS action levels. Treated groundwater is discharged to the site-wide water reclamation system. (EPA, 1989)

On- and off-site wells have shown low concentrations of toluene and other organic compounds. (EPA, 1989) These wells are not used as a source of drinking water but for other purposes, such as irrigation.

Rockwell believes that the historical pumpage of groundwater in the northeast section of the facility has created a large cone of depression that may have prevented the migration of contaminants off-site. However, the movement of groundwater and contaminants in a highly fractured system is very difficult to predict. (GRC, 1989) Additional placement and monitoring of off-site wells will be necessary to confirm Rockwell's theory.

3.6.3 Floodplains

The site topography, natural drainage and climate minimize any threat of contaminant releases to off-site due to flooding at the site. None of the SSFL facilities are located in the floodplain and all active areas are well drained to control stormwater runoff. Surface water runoff from major storm events is directed to the Perimeter Pond and the R2-A Pond with the opening of bypass culverts. (EPA, 1989)

3.7 Biological Resources

3.7.1 Habitats/Vegetation

The undeveloped areas within the SSFL site, both in open space and in the natural areas surrounding the developed site areas, consist of a large area of diverse habitats, primarily characterized as chaparral/oak woodland. This diversity is reflected in a wide variety of plants and animals at the site. The habitat and species diversity associated with the SSFL property, the physical attributes of the facility, and its geographic location make the area a potentially important route for effective movement of species. The open space at the site may play an important role as a habitat linkage between the Santa Susana Mountains, the Simi Hills, and possibly the Santa Monica Mountains. (Ogden, 2000)

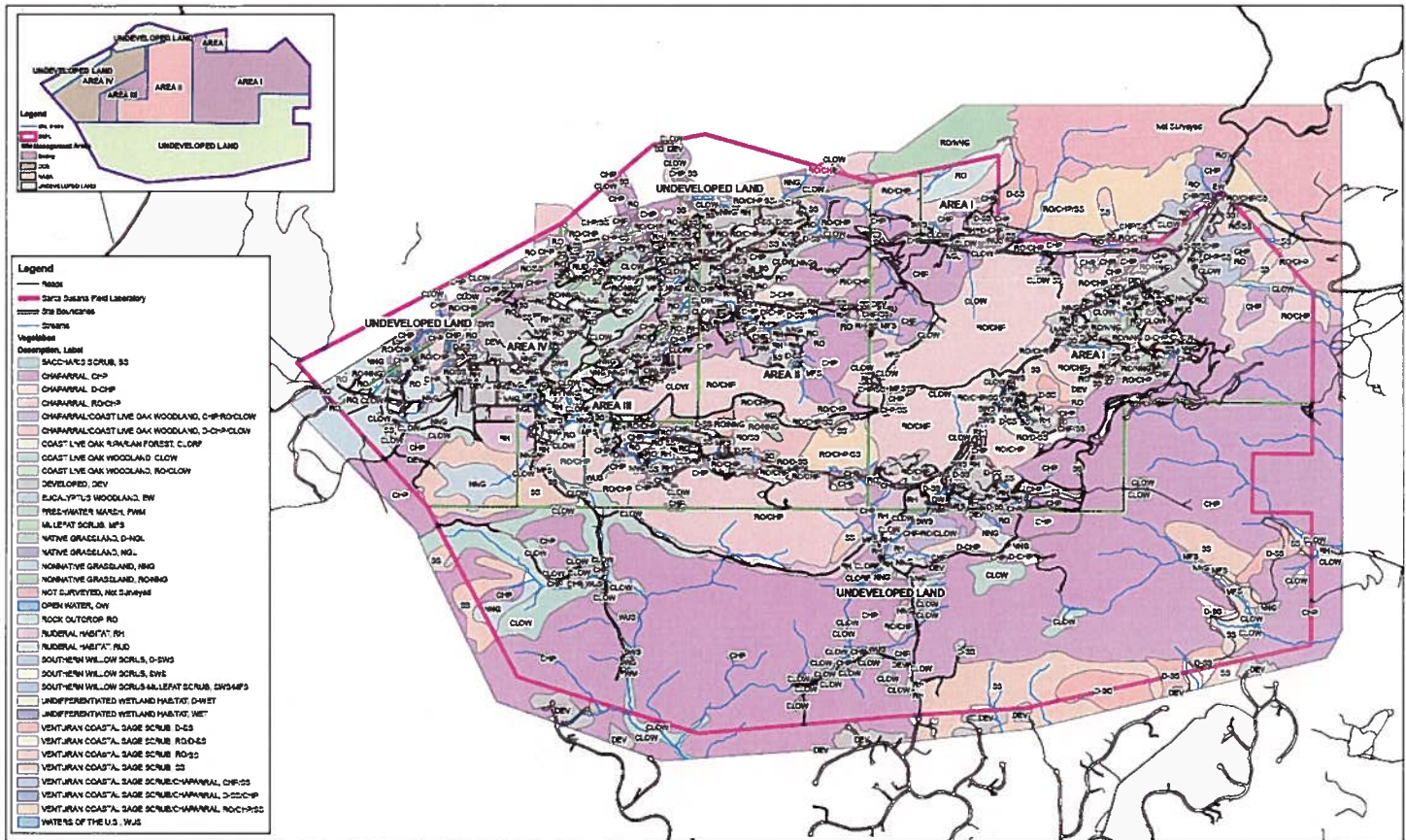
Sixteen different vegetation habitat types are found at the SSFL including freshwater marsh, open water, unvegetated drainage channels, coast live oak woodland, southern coast live oak riparian forest, southern willow scrub, mulefat scrub, baccharis scrub, Venturan coastal sage scrub, chaparral, native grassland, nonnative grassland, ruderal, rock outcrop, eucalyptus woodland, and developed (Figure 3-1). Rock outcrops occur throughout SSFL and may be found in any of the vegetation types (Montgomery Watson Harza [MWH], 2004).

3.7.2 Wildlife

Wildlife surveys performed at SSFL in the *RCRA Facility Investigation Program Report, Surficial Media Operable Unit, SSFL*, July 2004 (MWH, 2004) provide a basis for wildlife descriptions for SSFL. The wildlife surveys identified 13 mammal species including, bobcat (*Lynx rufus*) and mule deer (*Odocoileus hemionus*). Sixty-nine bird species have been identified at SSFL. The most frequently observed birds are scrub jay (*Aphelocoma californica*), yellow rumped warbler (*Dendroica coronata*), turkey vulture (*Cathartes aura*), red-shouldered hawk (*Buteo lineatus*), northern flicker (*Colaptes auratus*), California quail (*Callipepla californica*), red-winged blackbird (*Agelaius phoeniceus*), and great blue heron (*Ardea herodias*). Raptors found on SSFL include the sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), red-tailed hawk (*Buteo jamaicensis*), and great horned owl (*Bubo virginianus*). Ten reptile species and 3 amphibian species have been observed on SSFL. Western whiptail (*Aspidoscelis tigris*), side-blotched lizard (*Uta stansburiana*), California slender salamander (*Batrachoseps attenuatus*), Pacific tree frog (*Hyla regilla*), and California toad (*Bufo boreas halophilus*) are among the reptiles and amphibians found on SSFL (MWH, 2004).

Two fish species have been noted on SSFL including catfish and goldfish (MWH, 2004).

Figure 3-2 Vegetation Habitats on SSFL



3.7.3 Threatened and Endangered Species

No federally listed wildlife species occur on SSFL. California state wildlife species of concern found on SSFL include San Diego black-tailed jackrabbit (*Lepus californicus melanotis*), loggerhead shrike (*Lanius ludovicianus*), southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), two striped garter snake (*Thamnophis hammondi*), and Coast horned lizard (*Phrynosoma coronatum*) (CDFG, 2004).

Four sensitive plant species have been documented on SSFL. Braunton's milk vetch (*Astragalus brauntonii*) is a federally endangered plant that is present in the far western portions of SSFL (CNPS, 2007; MWH, 2004). Santa Susana tarplant (*Hemizonia minthornii*) is a California state rare plant that can be found on rocky outcrops throughout the facility (CNPS, 2007; MWH, 2004). California Black walnut and Mariposa lily have also been documented at SSFL.

3.8 Cultural Resources

Federal agencies are required to protect and preserve cultural resources in cooperation with state and local governments under NEPA and the National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470, Public Law (P.L.) 95-515). This report addresses only the cultural resources found within the boundaries of the NASA-owned property of SSFL.

SSFL has been active since 1947 and has included the research, development, and testing of liquid-propelled rocket engines and associated components (pumps, valves, etc.) It consists of 2,850 acres and is divided into four areas (Areas I to IV) and a Buffer Zone. The Air Force was deeded the land in 1958 and was 410 acres in Area II and a 42-acre portion of Area I. transferred to NASA in 1973.

3.8.1 Prehistoric and Historic Archaeological Resources

Seventeen archaeological sites (56-000151, 56-000152, 56-000153, 56-000154, 56-000155, 56-000156, 56-000157, 56-000158, 56-000159, 56-000160, 56-000161, 56-000764, 56-001065, 56-001066, 56-001067, 56-001068, and 56-001072) have been identified within SSFL Area II. One site (56-001072) has been determined to be eligible for the NRHP. Additionally, there are 16 sites that have been clustered into a single site (56-000151, 56-000152, 56-000153, 56-000154, 56-000155, 56-000156, 56-000157, 56-000158, 56-000159, 56-000160, 56-000161, 56-000165, 56-001066, 56-001067, 56-001067, and 56-001068). This cluster lies within the southwestern corner of NASA Area II and extends to the southeast into Boeing's undeveloped land (Bard, 2007:2).

Traditional Cultural Resources. The Burro Flats Painted Cave is listed on the NRHP, as well as on the California Register of Historical Places (2006). The period of significance of the cave is believed to be 1000 to 1499. The exact location of and access to the cave are highly restricted (Bard, 2007:3).

3.8.2 Historic Buildings and Structures

SSFL currently contains 109 individual buildings and structures were evaluated for historic potential in a historical assessment of SSFL in August, 2007. No buildings date from before World War II. Buildings and structures at SSFL were evaluated for eligible for NRHP listing based on association with key missions at SSFL, association with leading rocket engine engineering firms of the post WWII years, and association with the important professional contributions of particular scientists and engineers recruited to the Redstone Arsenal in the early and middle 1950s. TBD properties were interpreted as being eligible for the NRHP, TBD were suggested for reconsideration of NRHP eligibility in 10 years, and TBD buildings had insufficient information for NRHP assessment. The remaining buildings on SSFL were evaluated as ineligible for the NRHP (REF pending results of ongoing historic survey).

3.9 Air Quality

3.9.1 Region of Influence

For the air quality analysis, the ROI for project operational activities is the existing airshed surrounding SSFL. For regulatory purposes, project emissions would be compared to emissions generated in Ventura County.

3.9.2 Regulatory Setting

SSFL currently has a Title V Permit (#00232), issued by the Ventura County Air Pollution Control District. The sources covered by this permit are listed in Table 3- (NASA, 2006c). SSFL is located in Ventura County, which is classified as non-attainment for the 8-hour ozone NAAQS (EPA, 2007u). Therefore, SSFL follows the more stringent NSR program, and must evaluate all new projects under the General Conformity rule. SSFL is in attainment for all other NAAQS (NASA, 2006c). SSFL is also classified as nonattainment under the state ozone, PM-2.5, and PM-10 standards (<http://www.arb.ca.gov/desig/adm/adm.htm>).

3.9.3 Regional Climate

The average warmest month at SSFL is August, with an average high temperature of 96°F and an average low temperature of 58°F. The highest recorded temperature was 116°F in 1985. The average coolest month is December, with an average high temperature of 69°F and an average low temperature of 38°F. The lowest recorded temperature was 18°F in 1989 (TWC, 2007d). The maximum average precipitation occurs in February, with a monthly average of 4.40 inches. The minimum average precipitation occurs in July, with a monthly average of 0.01 inch (TWC, 2007d).

3.9.4 Emission Sources

Table 3-4 lists the permitted emission sources (NASA, 2007u) for SSFL.

Table 3-4 Title V Air Permits for SSFL

Permit Scope	Permit Number	Effective Date
Rocket Engine and Component Assembly Operations Alpha Test Area Bravo Test Area Advanced Propulsion Test Area	00232	July 1, 2006 – June 30, 2007
Systems Test Laboratory	00232	July 1, 2007 – June 30, 2007
Hypergol Facility	00232	July 1, 2007 – June 30, 2007
Rocket Engine and Component Assembly Operations	00232	July 1, 2007 – June 30, 2007
Remote Reservoir Cold Cleaners	00232	July 1, 2007 – June 30, 2007
Cold Cleaners	00232	July 1, 2006 – June 30, 2007
Solvent Cleaning Operations	00232	July 1, 2006 – June 30, 2007
Surface Coating Operations (Spray Booth)	00232	July 1, 2006 – June 30, 2007
Adhesive and Sealant Operations	00232	July 1, 2006 – June 30, 2007
Portable Diesel Engines	00232	July 1, 2006 – June 30, 2007
Emergency Diesel Engines	00232	July 1, 2006 – June 30, 2007
Groundwater and Remediation Operations	00232	July 1, 2006 – June 30, 2007
Gasoline Dispensing Facility	00232	July 1, 2006 – June 30, 2007
Boilers and Heaters	00232	July 1, 2006 – June 30, 2007
Solvent Wipe Cleaning Operations	00232	July 1, 2006 – June 30, 2007

Note: Ref. Ventura County Air Pollution Control District, 2006.

3.10 Health and Safety

The discussion of human health and safety includes both workers (NASA and other government personnel, and contractor personnel) and the general public. Safety issues include injuries that may result from one-time accidents. Health issues result from activities wherein people may be affected over a long period of time rather than immediately. The affected environment for health and safety includes those areas that potentially could be affected by the proposed activities. This discussion includes existing hazards such as emergency preparedness and response, explosion and fire hazards, and other Center-specific hazards. In addition, existing safety procedures are described. Issues related to the use of hazardous and generation of hazardous materials and waste are addressed under the hazardous materials and hazardous waste subsection of this EA.

3.10.1 Affected Environment

The SSFL Service Area provides many different operations including maintenance, protective services, R&D of various rocket engine components, final assembly for ELVs, and R&D for lasers. A buffer zone surrounds SSFL that protects the surrounding communities from accidents that might occur at SSFL. The following subsections outline SSFL's programs for protecting the health and safety of the employees at SSFL and the public.

Hazardous Materials. Hazardous materials are used to conduct maintenance, R&D, and assembly operations at SSFL. The hazardous materials used and hazardous wastes generated are as discussed in detail in Section 3.3.2. The degree of exposure to hazardous materials is minimized by the implementation of work practices and control technologies, which include, but are not limited to, the following:

- Controlled use and restricted access work areas and associated SOPs
- Ventilated storage areas and work areas for certain hazardous materials
- Regular monitoring to ensure that exposure levels do not exceed the OSHA standard thresholds.

The implementation of these work practices and control technologies minimizes exposure to hazardous materials. Risks associated with hazardous materials are managed under NPD 1820.1B.

Several SSFL buildings contain asbestos. Construction projects that involve asbestos removal are evaluated as they occur, and removal and disposal are performed per 29 CFR 1910.1001, OSHA's standard for the protection of employees from asbestos exposure.

Hazardous Materials. *Transportation Safety* Hazardous materials such as fuels, chemicals, and hazardous waste are transported in accordance with the DOT regulations for interstate shipment of hazardous substances (49 CFR 100 through 199).

Explosions and Fire Hazards. Using certain hazardous materials, including fuels, in SSP operations at SSFL presents a risk of explosions and fire hazards. Fire protection at SSFL is provided by Ventura County via 911.

Emergency Preparedness and Response. Emergency medical services at SSFL are provided by Ventura County via 911.

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